Text Normalization Challenge - English

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Introduction

Motivation

Main speech and language applications:

- Text to Speech (TTS)
- Automatic Speech Recognition (ASR)

Normalization is needed to adapt some written forms in order to be understood by the application

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Some Examples

In the following table we can see some examples of written forms that do not match the spoken form:

Written form	Spokem form
150lb	One hundred and fifty pounds
$3.16	Three dollars, sixteen cents
12:47	Twelve forty-seven

Introduction

Motivation

Normalization is needed for the good work of the voice assistants.

- Google Assistant (Google)
- Cortana (Windows)
- Siri (Apple)
- Alexa (Amazon)

Introduction

Motivation

This challenge belongs to a real kaggle competition

- 289 participants registered
- 270 teams formed

Rewards:

- 1st place: 12.000€
- 2nd place: 8.000€
- 3rd place: 5.000€

Introduction

Goal

The main goal of this project is to develop a system that:

- Adapt an English-German translation NN to the challenge dataset
- Normalizes the written expressions into readable expressions

Environment

Dataset I

Example (Dataset)

```
seqID, wordID, wordType, src, dst
0,0,”PLAIN”,”Brillantaisia”,”Brillantaisia”
0,1,”PLAIN”,”is”,”is”
0,2,”PLAIN”,”a”,”a”
0,3,”PLAIN”,”genus”,”genus”
0,4,”PLAIN”,”of”,”of”
0,5,”PLAIN”,”plant”,”plant”
0,6,”PLAIN”,”in”,”in”
0,7,”PLAIN”,”family”,”family”
0,8,”PLAIN”,”Acanthaceae”,”Acanthaceae”
```

Environment

Dataset II

Example (Dataset)

Brillantaisia is a genus of plant in family Acanthaceae .

University of California publications in linguistics (vol 35) .

Retrieved April 10, 2013 .

However , Kaede's oiled hair accidentally catches fire .

Tropical Depression Two was upgraded into a tropical storm in post season analysis , and as a result has no name .

Retrieved on November 4, 2014 .

Retrieved 7 December 2015 .

Francisca Josefa had three siblings whose names were Catalina and Pedro Antonio Diego

Henry moved in with Young at Carrigoona Cottage in 1929 , building a studio there .

Retrieved 3 February 2016 .

Environment

Proposed framework

- **Why?**
  PyTorch is a reliable language

Environment

Proposed framework

PYTORCH

Deep Learning with PyTorch

- **Why?**
  PyTorch is a reliable language
- **Advantages**
  More versatile than keras
  Easier to use than Tensorflow

Environment

Proposed framework

- **Why?**
  PyTorch is a reliable language
- **Advantages**
  More versatile than keras
  Easier to use than Tensorflow
- **Accessible material**
  We already have some code focused on translate from English to German

Set Up

Problem Analysis

Our problem, in reality, is a Machine Translation problem. From 'correct' English to a spoken one.

Set Up

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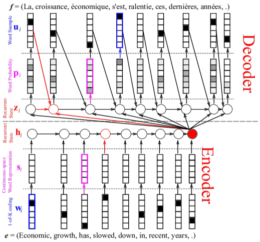
Database Examples

'Correct' English	Common Spoken English
Herry was born in Banda Aceh , Aceh from a Sundanese descendant.	Herry was born in Banda a c e h , a c e h from a Sundanese descendant .
1987 ALCS Game 2 - Detroit Tigers vs	nineteen eighty seven a l c s Game two - Detroit Tigers versus

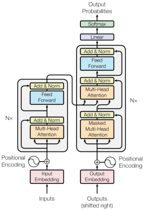
Set Up


f = (La, croissance, économique, s'est, ralentie, ces, dernières, années, .)
Word Sample u_i
Word Probability p_i
Recurrent State z_i
Decoder
Recurrent State h_i
Continuous-space Word Representation s_i
1-of-K coding w_i
Encoder
e = (Economic, growth, has, slowed, down, in, recent, years, .)

Lazy Machine Translation State of the Art

1. Statistical Machine Translation
2. Neural Machine Translation → Recurrent Neural Networks
3. Attention

Set Up



"Attention is all you need", The Transformer

- No RNN, just Attention mechanism
- Google Design
- Simple
- Fast
- State of the Art results this summer

Current results

Right now, our NN is training...

```
-Epoch 4:-
- (Training)
ppl:  1.58991,
    accuracy: 93.459 %,
    elapse: 153.527 min
- (Validation)
ppl:  1.49141,
    accuracy: 94.243 %,
    elapse: 11.279 min
```

Bibliography

Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, and Illia Polosukhin.
Attention is all you need.
CoRR, abs/1706.03762, 2017.

Questions?